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SYSTEMS AND PROCEDURES QUARTERLY

IN THIS ISSUE

Measuring Clerical Work—*L. Browne Helms, Jr.*

Systems and Procedures in the Control of Fraud —*J. S. Seidman*

Work Simplification—A Practical Approach —*J. R. Crowley*

Selling Projects to Management—*G. L. McKenna*

Control of Machine Accounting Equipment —*F. M. Johnson*

A Training Program for Systems Personnel —*H. J. Ihlenfeld*

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To promote the advancement of systems and procedures throughout all management. I shall uphold the standards of our Association and cooperate with others in the dissemination of knowledge on developments in our field.

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Not to accept commissions for the sale of equipment to my employer or my clients.

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I accept membership in this Association with a full knowledge of the responsibility it imposes upon me and I shall dedicate myself to the discharge of these obligations.

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May 1953

"Bootleg" Forms

FORMS Control is popular only with methods and systems analysts. It forces operating personnel to think, and as a result, many of them regard it as an obstacle. Often "Bootleg" forms are devised to circumvent established routines.

Now bootleg forms represent clerical work just the same as official forms. Because they are usually poorly designed and messy, more work is involved than with regular forms. Therefore, we should always be alert to keep this abuse to a minimum in our own companies.

The following statement was made by a prominent management consultant. "After examining the thousands of bootleg forms that I have discovered in my survey work and checking on the hours required for their use, I find that it only takes an average of 11 bootleg forms to create a full-time clerical job."

The bootleg form is almost always a product of the "captive" duplicating machine. Many office managers frequently do not realize the implications which will almost always follow after he approves the purchase of a duplicating machine for a department.

The elimination of the bootleg form is the responsibility of the methods man, but his task can be made a lot easier by an alert and cooperative management.

Measuring Clerical Work

by L. Browne Helms, Jr.

A 1952 Management Conference Paper

On the national average every $62,000 in clerical expense represents the profit from a million dollars worth of sales. Anything we can do in our work to continually reduce those costs will have the same effect as an increase in the sales volumes of our respective companies. At present salary levels, the elimination of the need for 16 clerical workers would be the equivalent of adding a million dollars to the yearly sales figures. It is a basic principle that any reduction in costs is an immediate, but some times short lived, increase in profits.

In our particular phase of business, the relationship between management, accounting details and clerical costs is in such delicate balance that any influence exerted against one will have its effect on the other two phases. An increase in management control will surely require more details and increase the cost. Conversely, a reduction in cost will surely require a reduction in details and may impair management control.

The administration of this relationship within the accounting and operating clerical activities is a science which is growing daily as the needs of business increase. it has been loosely termed the systems and procedures or methods function. However, before critically examining the work measurement phase as opposed to the procedures phase, we should establish the relationship of the function in the total affairs of any business.

The familiar picture of the cross-legged biblical scribe dots the annals of the world's early beginnings. At that time and even up until the Industrial Revolution in Europe, the demands for business records were simple and relatively limited. The farmer or land owner desired to know the heads of cattle that populated his pastures, the bushels of corn stored in his barn, and how much money was in his coffers. The development of the power loom, with its transference of labor from the home to the mill, made it necessary to maintain a record of the amount of work accomplished by each worker. The cost of rent, heat, light and repairs required to keep the machinery housed and in operation created further book work.

The advent of the American Civil War introduced the idea of a standardized product. The necessity of mass manufacturing and supplying uniforms, munitions and preserved foods, and the introduction of the Bessemer converter and process for making steel about 1865, provided the impetus with which the industries of the United States have risen to their present highly skilled and complex structures. With the expansion of mass production techniques, aided by an abundant and cheap source of steel for tools and buildings, the demands for all types of clerical assistance increased many fold. Inventories of raw materials and finished stocks were first to require controls. As business grew, the acquisition of additional machine tools and factories increased the burden of providing for and maintaining the facilities. Finally, the tremendous demands for products prompted process and production controls as well as incentive controls over the productive labor costs.

The manufacturing side of industry has gained efficient control over production costs by pioneering in the present day industrial engineering techniques. Process engineering, time and motion study, production controls, standard cost systems, budgetary cost controls, and utilization studies and controls of inventories, machine tools and plant facilities have been developed and employed in the science of manufacturing for a profit. The initial selection of the manufacturing operations was a natural course, since the labor involved coupled with the materials used constitute the major part of the ultimate manufacturing costs.

Concurrently the sole responsibility of accounting was to provide an almost unwanted record by which management determined the profitableness of its operations. It was tolerated by the production superintendents because the "old man" wanted the figures.

Recently a new concept commonly referred to as the

CLERICAL work measurement is the office counterpart of time and motion studies in industrial management techniques. It forms the backbone of clerical management, therefore it deserves as much thought in its application as the time study technique has enjoyed in the past.

Controllership principle has arisen. It envisions wide responsibilities for the accounting executive officer not only as a bookkeeper, but as an authority in matters of finance, accountancy and economics. From the beginning of business, accounting activities have been such an integral part of the total operations that it is difficult to fully appreciate the prejudiced attention toward production. The close relationship that prevails between payroll and process costs and the production departments, between accounts payable controls and purchasing functions, and between receivables or credit functions and the sales efforts, make a coordinated management program imperative. In a large organization, an accounting department must provide a complete service to all of the needs of management, the operating and sales departments, along with its own routine duties.

Surrounding and supporting the accounting executive is his staff, a group of technicians, skilled in the various functions which have become a part of his responsibility. Among these men is one charged with the responsibility to see that the details of the business are recorded at the lowest possible cost, yet provide management with the information it needs.

Where such a person exists, he is usually known as the Supervisor or Director of Procedures and his responsibilities may be divided into three classifications:

1. Control of the detail records and work flow or procedure writing.
2. Control of the clerical man hour requirements or clerical engineering as opposed to industrial engineering.
3. Research into new methods, equipment and procedures.

Procedure writing or standard procedure instructions are the process engineering of the accounting and operating clerical work. The institution and administration of present procedures stem partly from the current needs of business, partly from the fruits of research, and as a result of the critical analysis utilized to gain control over the clerical man hour requirements.

In the development of office procedures, let us not think only of the new procedures that can be instituted, but rather first concentrate on the improvements that can be made in going procedures. Consider an office method somewhat as compared to a ship. A ship is constructed and launched with the latest improvements and efficiencies incorporated. As it sails the seas, it gathers barnacles and the engines wear which reduce speed and efficiency. When this loss in speed and efficiency reaches a danger point, the ship is brought into dry-dock, the barnacles removed and the engines overhauled. Upon refloating, the ship is again able to sail with at least its original speed and efficiency. This process of dry-docking is repeated until obsolescence and general deterioration render the ship uneconomical to operate. Then it must be scrapped and a new ship launched to replace it.

In an office method, often several revisions of an existing procedure may be made profitably and economically before a complete new system is required. Therefore, before launching into a program of new systems, it would be well to establish procedures; to review and analyze present operations. A methods program cannot be considered complete until such time as procedures for obtaining control of the existing costs of clerical effort have been established.

Vital to Control

Clerical work measurement is the means of gaining the desired control over the clerical costs. It is the backbone of clerical management and cost control in the same fashion as time and motion study supports the present day industrial management techniques. Therefore, it deserves as much thought and attention in its development and application to clerical work as the time study technique has enjoyed in the past.

The need for some type of measurement is exemplified by the early methods to secure efficient clerical operations that have been discarded along the way. One of these was to secure an increase in the efficiency of the clerical employees by the "rule-by-force" principle, which meant — produce or get out. This method, although sound in its theory that employees should be fair productively, was negative in its approach and many times misused. Additional assignments were often made with little thought to the capacity of the clerical force to absorb the work.

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Another early method closely allied to the "rule-by-force" principle was the arbitrary percentage reduction of manpower with every shift of the "trade winds." The weakness of this type of control lies in the fact that the remaining force might be seriously overloaded by an inaccurate estimate of the true effect of the reduced business volume or by an overzealous attempt to get into the black again.

These and other inept, inaccurate and inadequate means of controlling clerical costs have been replaced in the minds of enlightened managements. "One shot" methods have given way to the increasingly popular method of establishing and administering variable budgetary controls over the clerical man-hour requirements of business.

Dynamic Control First

From a procedure standpoint the amount of money to be paid a given occupation is not the important point. But it is essential that, after studying the job and simplifying it to the extent possible, a control of the man-hour requirements should be available. The establishment and administration of a dynamic control are the primary and most important steps in an over-all clerical management and cost control program. Up to the present time, procedure activities have consisted mainly of the administration of the current procedural needs. However, through research there is a new survey technique gradually emerging in response to the critical condition of present day clerical expenses. This technique employs the well-known industrial engineering methods of operational flow charting and time study to ultimately develop a variable budgetary control in man hours. This survey technique also makes the details available in ready form for further use in the administration of a group of clerical employes.

Briefly, the clerical cost control survey technique consists of presenting existing clerical procedures through the media of operational flow charts. Unit time values are then assigned to each operation charted. These unit time values, extended by the volume or frequency of occurence will provide the total time requirement of the operation for a designated period. The operations drawn together by position will then reveal the effective utilization of the time of the incumbents. Proper allowances are incorporated for rest, personal needs, and peak load conditions. Any excessive reserve time will be disclosed in this manner and steps can be taken through the redistribution of assignments to insure an equitable distribution of the work. The revised position descriptions, through the use of budget standards, form the basis of a monthly budget control of the clerical hours. These budgets will preserve the benefits of the survey.

Through the use of monthly budgets, attendance hours are measured against standard hours for the current level of activity and the efficiency of performance is obtained. However, it should be stressed that the philosophy behind their development or use is of more importance than any method created for their accomplishment. The need for control of clerical costs is obvious. It is just as necessary as the control of production costs. Clerical costs can be controlled on any routine work. A clerical cost control program supplies the answers to such vital questions as:

1. What is a proper standard of performance?
2. What is a fair day's work?
3. What is an adequate method for loading jobs on the basis of a fair day's work?
4. How are force requirements determined and maintained so as to recognize changes in the volume of work load?

In return for a chance to get ahead and fair remuneration, the supervisor, who is a vital part of management, must conduct the affairs of his office in such a manner as to secure maximum production at minimum expense. To accomplish this management goal he must know both the volume of work that constitutes a fair production output for each job and the man hour labor cost to produce it. He must know also the best management methods by which he can obtain the required production from his employes, who are not machines that can be automatically geared to produce a given quantity but are variable human beings who must be recognized and treated as such. In the final analysis, the dual objective of maximum and economical production can be accomplished by the supervisor only through the interest and cooperation of his personnel.

Time Standards Applied

A contemporary opinion with the early "one shot" methods was that the application of time standards in the form of incentives could effect the desired economies. To this end, as early as the twenties, some courageous business concerns applied time standards to the solution of highly specialized clerical problems. Mail order houses, magazine publishers and department stores, among others, applied engineered incentive plans to the processing of orders, bills, subscriptions, policy writing, filing, and general stenographic operations. Any operations containing large volumes of highly repetitive work lend themselves to this approach. A few disastrous attempts to apply incentives to a variety of less voluminous assignments discouraged any wider applications in the large, as well as the medium and small-sized business concerns.

While there may still be divergent opinions as to the relative merits of standards as applied to office routines, the use of standards for measuring the effectiveness of office personnel is gaining more widespread acceptance. However, two basic principles must be established:

1. In clerical operation, standard time data will be used primarily as an administrative tool of control

and only secondarily as a possible means of incentive payment, limited to highly repetitive operations.

2. If a form of expression is available to permit the orderly presentation of the facts expressed as time values, it is possible to utilize those facts to organize a more efficient clerical program.

The fact that office operations are not as routine nor clearly defined as those of the production line, limits time study for incentive applications to those same highly repetitive operations which proved successful in the early days. The approach is the same as in shop operations and generally will incur similar administrative problems and expense.

The desired orderly form of expressing the facts in terms of time is the previously mentioned survey technique which is fast becoming highly specialized. A procedure analyst must be trained into the concepts of establishing unit times before he can make a satisfactory survey. However, the principles and philosophies are much more readily understood. The remaining comments will be confined to the latter and we will leave the technique to those people immediately concerned with development of clerical cost control surveys.

The application of time to clerical operations in the form of unit time values is the one accurate way in which to compare a conglomeration of skills and methods. Overloads and underloads in skilled and totally different positions can be readily isolated and adjusted. It is not uncommon to find that an apparently busy person has been stretching an inadequate assignment over a full day. This and other examples which will occur to you are only natural reactions. No one wishes to appear idle. That's tantamount to being unnecessary.

Three Phases

These same time values make it possible to properly evaluate the need for statistical quality, or in clerical activities — checking, controls. They also point the way to extensive yet profitable work simplification programs. They provide the means with which to evaluate and compare similar procedures or proposed procedures with existing procedures. And finally, they provide the means for making equipment utilization and comparison studies.

There are three major phases in the application of time standards to clerical operations:

1. The establishment of the unit time standards and their application.
2. The establishment of uniform or standard clerical methods in conjunction with the application of unit time standards.
3. The training of clerical employees into the use of established standard methods.

Clerical operations can be broken down into their elemental parts just as readily as manufacturing operations. In this state they are easily timed in the usual manner. As a matter of fact, in the absence of existing standard data, it is quite possible to assign accurate elemental unit time values by time checks with the second hand of an ordinary watch, or by estimation. These last two methods are not productive of standard time data, but serve well as interim measures while the more tedious work of developing standards progresses.

The standard elemental unit time values are secured by time studies and should be preserved in that form, thereby making it possible to evaluate a variety of clerical actions by identifying the elemental motions and assigning them standard unit times selected from the array of standard data.

Figuring the Average

To reiterate, the assigned unit time values, whether standard or otherwise, are multiplied by an average volume or frequency of occurrence, during the desired accounting period, to produce the total average time requirement of each charted operation. The accuracy of these times is based upon the finely subdivided elemental motions which permit the law of averages to work. High values will offset low values. Care must be taken that an extremely large volume does not invalidate this assumption. These operational times are thus available for comparison by position or procedure, for control through scheduling and budgetary methods, and for revision by research.

The development of standard unit time data has revealed many curious and useful facts. Like a marine garden, it has brought to light heretofore obscure truths and fantasies surrounding the operation of office equipment. One major observation, with all respect to the office equipment industry, is that much of the savings credited to past installations of equipment were really due to the ability of the salesmen to organize the work itself and not to the extreme superiority of the machine operations. This is particularly true of machines requiring a great amount of clerical handling time along with the actual machine operation. The net unit times including all of the clerical handling often closely approximate the unit times of the original operations. As an example, consider the alphabetizing, prestuffing and machine posting to customers' ledgers in an accounts receivable operation against the original operation of alphabetizing and posting to hand ledgers. One of the greatest economies of this operation, outside of the tireless constancy of the machine work, is the ability to accumulate multiple totals, as a by-product. This saves the time to subsequently add the postings.

Available facts definitely prove it makes little difference whether a full keyboard or a ten key adding machine is used in most addition problems. In values containing five digits or less, the entry times per digit for both machines

establish curves that closely approximate each other. Beyond five digits the ten key machine establishes a superiority. At that point a factor of searching for the proper bank of keys enters into the full keyboard machine operation retarding the operator.

Operations which would cause a reference back and forth between the work and the full keyboard machine can be more efficiently performed on a ten key machine where its touch operation will eliminate that need.

These and many more revelations are bringing the claims and counter claims of competitive office equipment into the realm of scientific comparison and application to the work at hand.

There are several sources of the data required to establish standard unit time values.

1. The details of existing incentive plans can be reworked to present the elemental unit time data rather than so many pieces per hour.
2. Time studies of actual operations may be conducted and developed.
3. Micromotion film studies may be made and analyzed.

Of the three methods listed, the last is the most expensive and requires several thousands of dollars to establish adequate facilities. However, its results are more conclusive and satisfactory for these reasons:

1. The film establishes a permanent source of reference to exactly what was done during the study.
2. The film analysis of the motion patterns presents an opportunity to do a much finer job. Many peculiarities that would be overlooked or hidden in a stop watch study will become apparent during the development of the elemental unit time values.
3. Motion patterns can be studied and compared to improve the method of doing a job.
4. Films of the ultimate method are available not only for analysis but for training purposes as well.

The establishment of uniform or standard clerical methods has in a sense been forced to the front by the application of standard unit time values to the work. Many times two or more methods of accomplishing the same clerical operation have presented themselves. Both have been accepted as efficient in the past. If the most used method proves faster than the alternate, there is no problem, but too often the faster method is not commonly used, or even taught in our commercial schools. The latter case creates an additional burden of retraining existing personnel. For all practical purposes the most efficient method should prevail and be adopted as the standard method. The continued repetition of an improper method will compound the inefficiency and added cost at an alarming rate. The establishment of the one standard method for clerical operations will facilitate their comparison in the same or several procedures.

Personnel can be trained in the use of the established methods by on-the-job training, classroom work and pre-indoctrination classes for new employes. One of the most important aids to this training is the development and maintenance of a standard methods manual from the details available in the clerical cost control surveys and the film or time studies.

A companion approach to the control of clerical expense utilizes the results of research and practical experience in the design of future procedures.

Research is the backbone of any industrial movement, and is just as important to the proper control of clerical costs as it is to the control of manufacturing costs and product development. Its boundaries are limitless. No attempt should be made to restrict the directions taken other than to properly time the projects with business needs and observe the law of diminishing returns. The development of new methods and machines are an important way in which to reduce the number of man hours necessary to adequately record the business transactions of an enterprise.

Design New Procedures

New procedures should be designed to take advantage of the latest developments in methods and machines to: (1) Make a fuller use of machines toward the elimination of hand operations of all kinds. (2) Simplify the work by transferring the laborious manual tasks to machines wherever possible. (3) Aim toward the development of simple by-product controls and proofs of accuracy to reduce expensive checking operations.

In many accounting procedures and practices too much time is expended in developing controls and checking and proofing accounting data. The cost of the proof often times exceeds the amount being controlled. It appears as though little thought has been given to the worth of the items in a desire to satisfy some concepts of internal control. Several organizations, through the dictates of specialized problems, have turned to the statistical quality control technique developed in the shop and are pioneering in its application to clerical work. They are applying the technique in varying degrees to decrease the cost of checking clerical data and improve the general level of the accuracy in the office. In one instance, the technique has been carried to the point where tabulating cards are created and samples inspected for the classified data, while the values are proven against predetermined controls. This eliminates not only the verifying operation, but the machines themselves. It has been stated that the technique has an accumulative effect. The investigation of the cause of the errors improves the quality of the work entering the inspection points,

(Continued on Page 24)

Systems and Procedures in

The Control of Fraud

by J. S. Seidman

BUSINESS loses $500,000,000 yearly through employee fraud, and since the nefarious practice is "here to stay, humans being what they are," it is up to auditors and personnel people to do what they can to keep the figure at a minimum.

A 1952 Management Conference Paper

EMPLOYEE fraud is a good sized industry in itself. The amount that business loses each year through employee fraud is five hundred million dollars. That's only the amount that is discovered and reported. I haven't the slightest idea of how much is discovered and not reported, or how much is never discovered at all.

Now the fact that employee frauds should come to that staggering amount isn't particularly exciting. After all, employee frauds are just a human weakness and there are plenty of us humans around to be weak. But I think the part that does bring a blush, at least to the cheeks of us auditors, is to find that these frauds have been going on for many years, in the face of audit pursuit, internal control, systems, etc. Even that wouldn't be so bad, were it not for the fact that often when these frauds come to light, it isn't you or I that have caught up with them at all. Like as not, it will be some happenstance, some fortuitous event, some piece of luck completely unrelated to auditing technique, that will reveal the fraud.

I don't say this in disparagement of auditing. The fact of the matter is that through auditing and systems work more frauds have been prevented or detected than have been perpetrated. But the blunt fact also is that many frauds have defied our science and have defied the calendar.

In the face of that problem, the New York State Society of C.P.A. decided that it would like to have a case study made of this elusive type of fraud, to find out why it is that they do get by. It fell to my lot as a committee of one to handle that study. I will review the results of that study here.

About five hundred cases came to my attention, submitted by industrial companies, their associations, by banks, insurance companies, stock brokers, etc. Everything I mention in this article will be based solely on that study. In other words, we won't enter into any classroom discussion of fraud. Rather, it will be the hard knocks

and provocation of actual experience that we'll use to guide our way.

Before we review some of the cases of fraud and find out what went wrong, perhaps it might be well to get an idea of what the average wrong doer looks like, as revealed by this study. Here is a picture of the man who goes wrong. He will be about thirty-six—I say a man, though the cases show that the honors are even as between men and women. He is married, has two children, earns about five thousand a year, drinks moderately, owns a car and takes active part in social and communal work. He has been with the company about five years and ironically enough, he has made his way to a position of trust by honest, commendable effort. He will occupy any job from watchman to president and live anywhere, at any time. In other words, the simple story is that anybody is a potential fraud doer, at any time, anywhere. That, of course, is important in trying to figure out ways of buttoning up fraud through your systems.

How They Do It

How does he steal? By and large, these cases show that the method of fraud that the employee will take, will generally be of a character that in time will have to reveal itself. That isn't difficult to understand, because this type of thief, in his own mind, isn't stealing at all. He is temporarily borrowing from his company and his plan is to make restitution before that point of time is reached when the fraud will of its own weight reveal itself. For the same reason, the average fraud doer rarely will go in for collusion. Since, in his own mind, all he is doing is making a temporary loan, he isn't inclined to let anybody else in on this temporary aberration of his.

What does he do? He will tamper with money on its way into the company, as one approach. He will tamper with customer's payments. The most active form of that is what we accountants refer to technically as lapping. He will also divert monies, the receipt of which will not ordinarily be anticipated in the general run of books. For example the sale of scrap, collections on an account that had been written off, or interest on overdue accounts.

But it isn't only with money on its way in, that the average fraud doer will meddle. He'll help himself to money already in the bank account of the company. What he'll do is make phoney payments — such as tampering with the payroll, nicking the petty cash, making false purchases, etc.

Why does he get by? The answer is very simple. In the last analysis, there are only two ways of catching up with fraud. One is by accounting controls and the other is by human beings. You will find that in every fraud case, one or both of those mechanisms for catching up with fraud have gone wrong. So far as accounting procedures are concerned, or your systems procedures if you will, most of these cases show that the system of internal control was half baked. You know you don't have to be very smart to creep through holes of an inadequate system. But it is also true, these case histories show, that all of the systems and controls that the books describe cannot stop the thief if management — the human element in the protective screen — is careless.

When it comes to the outside supervision of an audit, in many of these cases the audits were limited in scope. You know that if you take a poor audit, with a poor system of internal control, you might just as well give the key to the safe to the fraud doer and save him and yourself a lot of time and trouble. But the cases also show that fraud was committed in the face of an audit, the scope of which gave the auditors all of the rope that they needed and still the thief didn't hang. That's because we auditors also are human beings and we likewise will occasionally err.

Let me give you a few of these cases and you will see what I mean.

First, a payroll fraud. The company, a large one, was on a piece rate system for the factory help. The company didn't want to be bothered with pennies on the payroll, particularly since it paid by cash. So it had an arrangement whereby if the computation came to three cents or more the employee got the nickle. If the computation was two cents or less, the pennies were dropped.

Engineer of Fraud

That was the "gimmick" around which the fraud was pulled. The fraud doer was the fellow in charge of the payroll and here is what he did. In preparing the payroll, invariably he would make the computation for the books come to three cents or more. But when it came to paying off the help, he would show the computation to come to two cents or less, which justified him in doing a little nickel snatching out of every pay envelope.

Let's analyze to see whether there was any reason for this fraud ever getting started, no less getting off the ground. To begin with, the books tell us aplenty that in any substantial company, when it comes to payroll there should be a division of functions in the handling of the payroll, so that one person prepares the payroll, another person will stuff the envelopes, a third person will take care of the payoff. Let's assume for some reason or other that can't be done. Well, it seems to me, a little common sense would indicate that when you pay your help in cash, the least that should be required is a receipt from the employee of the amount that he gets. If that simple procedure had been followed, this payroll clerk would have never dreamed up the idea, because he would have been apprehended immediately.

Let's go to case number two. Here the villain was a person connected with two businesses. He used one against the other. He was the cashier of a bank, and

a treasurer of a charity. Here's what he did: Let's suppose the bank would buy ten thousand dollars worth of government bonds. The bank recorded this on its books and put the bonds in the bank's vault. The cashier would then buy ten thousand dollars worth of the same kind of government bonds for the charity. He would report to the charity's bookkeeper the purchase of these bonds, but he reported to the bookkeeper of the charity the numbers on the bank's bonds. He would then sell the charity's bonds and pocket the proceeds himself, never saying anything at all to the charity's bookkeeper. So the charity would still show on it's books ten thousand dollars of bonds and the numbers on the bank's bonds.

Whenever there was a bank audit, the auditors would go to the bank vault and there were the bonds and there were the numbers. Whenever an audit was to be made of the funds of the charity, the cashier had only to go to the bank's vault, take the ten thousand in bonds out of the vault and put them in the charity's deposit box. The auditors then come along, opened the box and there were the bonds and there were the numbers.

What would you do in a case of that sort? In the case of a charitable institution that isn't engaged in active trading in securities, bonds can and should be registered. Of course, if that happened, the cashier would never get started. A simple procedure that prevents this type of fraud, is to adopt a rule that two people are needed to gain access to a safety deposit box. You remember I said that very rarely does the fraud doer go in for collusion and that is particularly true as you get higher up in the executive ranks.

Petty Cash Fraud

Let me give you another case — one that has to do with petty cash and a woman who had charge of it. The company had a lot of salesmen. They had to go out on the road a great deal and they would come in and ask for a travel advance, that they would get from the petty cashier. Let's suppose a salesman wanted $50. Well she had him make out a petty cash slip, the salesman would make it out, using the figure, 50. She would give him his fifty dollars. The cashier would then stick a one in front of the five and that would give her a slip for $150. which entitled her to draw one hundred dollars out of the petty cash box.

The trouble with that arrangement was that it charged the salesman with one hundred and fifty dollars, when all he was going to account for was fifty dollars, but that didn't bother her. When the salesman would come back and he would have an accounting for, say, thirty four dollars and ten cents. She would stick a one in front of the three and that would have him account for one hundred and thirty four dollars and ten cents. Now everybody was all squared off and she was ahead one hundred dollars.

There is no reason why that fraud should have been successful. If a company is in a situation where petty cash is fairly active, the cashier ought not to be a person whose duties embrace not only the handling of the funds, but also the receipt of the accounting for those funds. More important, the simple application of these rules would kill the fraud. Petty cash slips should be made out in ink and the dollar amounts must be in writing and in figures, as in a check. An adeptness at forgery would then be required, and that's something which very few people have.

Let's draw some conclusions on the problem of employee fraud. To begin with, I can tell you that if I gave you the entire five hundred cases, you and I would come off with the same answer — that there are all of the systems procedures, all of the control procedures and all of the audit procedures that are necessary to catch up with fraud. Sure, they take time and they cost money. Business is continually engaged in the process of balancing cost against risk.

Bonding Only Helps

Many executives, recognizing that they are gambling, will follow the policy of bonding their employees. I have no doubt at all that the mere existence of a bond, will in many instances be a great psychological deterrent from the commission of employee frauds. But I want to point out that a bond isn't worth the paper it is written on and a premium is an absolute waste unless the fraud is discovered.

What then is the answer? Since fraud is a matter of human beings going wrong and since some of us are weaker than others, the answer obviously is in the character of human beings employed by the company. That means that the real hope for fraud prevention or control, is in the personnel department. It is a matter of effectiveness in the selection of an employee, not in terms of the technical knowledge the person has, but rather his outside interests and pressures, his financial requirements, the type of family life he leads.

Finally, I must confess, even when we have all this buttoned up, we must still reconcile ourselves to the fact that fraud is here to stay. But I do think that an honest inspection of accounting and system procedures will cause this half billion dollar annual industry to shrink, so that the pickings of the perpetrator of fraud become leaner and leaner. • • •

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Work Simplification — A Practical Approach

How would you react to a want ad in your local paper that read something like this:

"Wanted — men to assume positions of almost unlimited responsibility and authority in jobs of fascinating interest. Substantial opportunity to please the boss, attract favorable attention and do good. Excellent chance for good man. Salary open."

Would you take the ad seriously or would you consider it a somewhat hysterical outburst of a high-powered, promotional, fly-by-night outfit?

Actually, this type of ad is being written, one way or another in literally hundreds of companies all over these United States. It's a job offer for the men who can develop programs to eliminate one of the major problems in business today — waste.

Those programs we call work simplification. Others have called it "the organized application of common sense to eliminate waste of any kind — waste time, energy, space, equipment, materials. Make no mistake — for the man who can develop such a program in his office — the opportunities listed in our want ad are not exaggerated.

If you do not agree with these statements, let's take a look at the pressing need for work simplification in industry today. In a recent publication, the Office Equipment Manufacturers Institute stated the problem on a broad scale rather concisely when they said, "America today faces a three-fold job: (1) we must build a military force capable of meeting any challenge; (2) we must produce military goods for our own military forces and for the military forces of other free countries; (3) we must produce for civilian needs enough to support the defense effort and ward off inflation."

From your company's standpoint, the problem probably can be stated like this:

(1) We must reduce all expenses possible to compensate for increasing labor and materials costs and increasing taxes.

(2) We must increase productivity to compensate for the loss of trained personnel to the armed forces and defense industries.

(3) We must simplify work to compensate for the fact that in the present labor market we cannot always secure personnel with the experience and training we desire.

As OEMI rather succinctly asks, "Can We Do It?"

The answer to this question is "Yes, of course we can do it." We can do it if we possess and use four simple keys to work simplification. These keys are: the desire to simplify work; the ability to translate that desire into action; a systematic approach; and an open mind.

In recent years, many companies have become increasingly aware of the problems of simplifying work and the need to do something about it. Certainly these companies had the desire to simplify work and were ready to translate this desire into action. All they needed was the technical instruction as to the systematic approach to their work problems.

In studying the problem of how to simplify work in a case study it was necessary to find out four things: What work was being done; who was doing the work; how much time was devoted to it; and how was the work being done.

In looking around to find a way to determine these facts quickly and accurately this company discovered the work simplification program described herein.

Who did the program apply to?

(1) Approximately 100 persons in five sections of the company's Office Management Department.

(2) This department is basically what you might know of as an office service department. It is organized on a straight line basis with each section supervisor reporting to the office manager.

Who participated in the program?

(1) All the employees of the department on an informal basis.

(2) The office manager, section supervisor and assistant supervisors on a formal basis.

How was the program presented?

Every effort was made to follow the program exactly as developed. Formal presentation actually consisted of six steps:

(1) *Formal Announcement.* Formal announcement of the program was made in two ways:

(a) By a letter from the secretary-treasurer to all employees of the department in-

A 1952 Management Conference Paper

by J. R. Crowley

volved, telling them about the program and their part in it and requesting their cooperation in making the program a success.

(b) By a letter of announcement by the department manager to all participants (the supervisory personnel) outlining the extent and coverage of the program, the meeting schedule, etc.

(2) *Employees Informed.* To avoid possible employee repercussions, the entire program was explained to all employees of the company through:

(a) Group meetings

(b) Use of a pamphlet describing the program

To encourage employee participation in the program, an informal suggestion plan with merchandise awards was established.

To instruct employees as to how to think in terms of simplifying work, each employee was given a Work Simplification Check List to help them spot possible sources of improvements.

To eliminate fear of job security, employees were informed that no one would lose their job as a result of this program, but that any reductions in staff would be handled by transfers or normal turnover.

(3) *Program Presented.* The program presented to the Supervisors consisted of one instructional meeting for each of the three tools of work simplification used and one laboratory session to consider the practical application of the tool to the problems of the sections involved.

Three tools of work simplification were employed:

(a) Work Distribution Chart

(b) Process Chart

(c) Work Count

A detailed description of these tools of work simplification are available in pamphlet form from the Superintendent of Public Documents, Washington, D. C. In the instruction sessions, supervisors were given complete instructions as to the use and purpose and interpretation of each of the work simplification tool.

In the laboratory sessions all participants together reviewed the work distribution charts and process charts prepared by each member of the group. Every effort was made to develop immediate on-the-job improvement.

(4) *Improvements Made.* As a result of the laboratory sessions, several supervisors discovered immediate savings to be made. Supervisors were encouraged to make their own changes where possible.

(5) *Improvements Reported.* In order that an up-to-date record of the program could be made, all changes or improvements made were reported in a supervisory work simplification accomplishment report. These reports were recorded by the personnel administering the program and placed in the personnel folders of the supervisors involved.

(6) *Follow-Up Made.* The department manager maintained a follow-up with his supervisors to make sure the program was being utilized.

What were the results? Changes in procedure were made that reduced operating expense $3200 per year. The cost of presenting the program, including materials and supervisory time, amounted to $2300. Net savings for the first year then amounted to only $900.

While any reduction in expense is obviously desirable, in view of the extensive nature of the program, it was felt that basically the program had not been a success and a determined effort was made to study possible reasons for this result.

Possible reasons for program failure. In reviewing the reasons as to why the program had not been more successful, the following were considered as possible answers:

(1) Too much emphasis on tools

(2) Supervisors were working supervisors, and did

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not, or thought they did not, have time for the program

(3) Supervisors had no goal

(4) Supervisors were not sold on the program

(5) Lack of adequate methods control

(6) Lack of work flow in unit

The Successful Program. After reviewing the reasons for failure on our first program, it was decided that the idea was basically sound, the work simplification tools practical, but that the techniques of presentation and administration were in error.

It was decided to try the program again on a smaller scale.

The program was the same as the original program except that:

(1) With one supervisor only, no formal meetings were held, thus reducing presentation time.

(2) The supervisor still carried the ball on the program, but he was given direct assistance and council at all times by a senior methods analyst from the methods and procedures department.

Who did the program apply to?

(1) Approximately 15 persons in a sales adjustment unit (Sales Adjustment Unit is a part of the company's billing section that handles miscellaneous billing and sales adjustment problems).

(2) Directed by assistant supervisor, who reports to supervisor, billing.

(3) Assistant supervisor was junior methods engineer of former program. Supervisor is young, alert, talented, methods conscious. Assistant controller and controller interested.

How was the program presented? Same as before except: program was informally introduced. No formal program presentation held. *(Continued on Page 25)*

WORK SIMPLIFICATION CHECK LIST

A check list to help you spot possible sources of improvement in the forms, equipment, and methods with which you work.

FORMS:

1. Is the form necessary?
2. Is the information required clearly indicated?
3. Is there ample space for all entries?
4. Can the form be completed in conjunction with or combined with other forms?
5. Is the form properly spaced for entries by hand, typewriter, or office machine?
6. Does the form require typing an envelope when a window envelope might be used?
7. If the form is to be typed, are all items possible arranged horizontally for speed in typing?
8. Are you typing or writing information on the form that might be pre-printed?
9. In typing a form can you use your tabular stops?
10. Is there any unnecessary data on the form?
11. Could a continuous form be used to advantage?
12. Is pertinent data for filing in an easily readable place on the form?

EQUIPMENT:

1. Is your equipment in good condition?
2. Is there a fixed location on your desk for all equipment you require?
3. Are your desk and chair at the proper working height?
4. Would work holders be of any help?
5. Would several disposal bins help to eliminate or reduce subsequent sorting operations?

METHODS:

1. Why is this step necessary? Can as good a result be obtained without it? Is it an absolute must? Don't be mislead by an excuse when you are looking for a reason.
2. Where should this step be done? Can it be done easier with less time and transportation—by changing the location of employees or equipment?
3. When should the step be done? Is it done in right sequence? Can you simplify or combine steps by moving this step ahead or back?
4. Who should do the job?
5. How is the job being done? Can it be done better? Could the job be mechanized?
6. Is there any unnecessary re-writing of information?
7. Can the work be done in multiple?
8. Can the work be pre-positioned?

Selling Projects to Management

A 1952 Management Conference Paper

by G. L. McKenna

THE dusty archives of industry contain many a plan, project, idea, or recommendation which for one reason or another never got the green light of approval. In this paper I shall attempt to point out some of the pitfalls which beset the middle management supervisor or manager in getting approval for his recommendations. Particularly I shall discuss some operating practices, principles, and just plain know-how that bring success in obtaining that much sought top-management nod of approval.

It is customary in the introduction of a formal paper to set the sights for the reader by indicating the scope of the subject and also define some of the basic and often used terms. While this presentation lacks such formality, some such explanation will be helpful.

First of all, what do we mean by management? Because we shall consider projects as items of importance, it is logical to assume that the presentations of these projects justify the attention of top-management people. By arbitrary definition then, for our particular purpose, management is defined as the officers or top executives of an organization who have the stature and authority to make major decisions.

Next, what do we consider as projects? Of course we all know that approval must be sought, and either given or denied, in hundreds of the daily transactions of a busy corporation. Our term "projects," however, is thought of as non-routine, of major importance, where considerable effort goes into the preparation, and its success or failure has a distinguishable effect upon the division or department involved, or upon the company's operations. Programs of long range nature will be considered as projects in this discussion, as each is handled similarly from the standpoint of preparation and presentation.

Because our projects have been indicated as plans or programs of major importance, they very often involve substantial sums of money, either as current or capital expense. The approval of such a project may involve risking existing investment, inventory, or similar assets. Furthermore, the importance of such projects is often enhanced because the plans include changes in policies, products, or organization.

Now that we have an understanding as to the meaning of projects and management, let us see where some of these projects originate. What causes them to be undertaken in the first place? From our own experience we can supply most of the answers. Frequently a project is assigned to some individual or group by a top executive or committee. Perhaps the company is considering building a new plant, adopting a new product, opening a new district sales office, floating a bond issue, a new pension plan, a sales incentive practice, a new engineering laboratory, a new cost control plan, a job evaluation system, a time study plan, or a major change of organization. These are merely a few examples, but the need for a decision based upon an analysis of facts is definitely required in each case.

Usually top-management will assign an individual or group to study the subject and come up with a report. Frequently, however, the individual responsible for some activity wishes to improve it through some changed technique, new method, or reorganization, so he makes the study on his own initiative to work up a comprehensive program for presentation to his management. For instance, the personnel director probably would recommend

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the new job evaluation system; the controller would study and present the new cost system; and the chief industrial engineer or systems and procedures manager probably would attempt to get management to agree to the new wage incentive plan.

Regardless of how the project may have originated, we find that successful selling of projects to management involves two important functions or organization and management. These two functions are *Research* and *Salesmanship.* First let us consider the place of research in selling projects to management.

If you were to ask the man in charge of research in your organization how he launches a new project, I am sure he would tell you that he first must find out all about the problem; i. e., he gets the problem defined. In any project for management, this is most important. Frequently a project of some importance is assigned to an individual very quickly or even casually. This is the time to get the facts straight. Frequently a man, several organization levels below the executive handing out the assignment, may hesitate to insist on clarification. Unless he knows accurately and exactly just what the executive desires, he may waste time and money and, in addition, suffer the embarrassment of coming up with the wrong answer.

A project such as we have defined usually requires careful planning, and may involve the time of one or more individuals plus expenses for traveling and similar items. Often the help or assignment of other functions in the organization must be pressed into service to aid in the survey, to provide clerical or stenographic assistance or even perform experimental work. All these services and assistance must be lined up and agreed upon as early as possible if the final report is to be delivered at the requested date. Because the executive requesting the survey is usually most interested in obtaining it, sometimes it becomes necessary to go back to him to get supporting expense money or company services. In any event, don't accept an assignment of importance without the provision of the tools to do the job.

How Much Time?

Similarly, you must get agreement on the time required to make your survey and present your report. Assigned surveys are almost always wanted in a hurry. Don't allow yourself to be rushed into a bad decision. Here you must be firm and insist on an adequate amount of time to do the job properly. If the project must be done quickly, then your plans may change in that you will need more help. In every case get agreement on the date you will finish the job, then by hook or crook stick to it. The first strike against you in selling projects to management comes when you are forced to apologize for being late.

Now we come to the survey or research task itself. Time does not permit an exposition on research methods and, for a group of systems and procedures people, it is probably unnecessary. Besides, the projects such as we are discussing take so many forms that only generalizations would apply. I do think, however, that a few practical suggestions will prove useful.

First of all, keep an open mind until all the facts are in. This advice sounds almost foolishly unnecessary, but such is not the case. The systems man may think he already knows the best production control method; the industrial engineer knows a great deal about wage incentive plans; the sales manager is confident that he has the right answer for distribution of his product. Each, however, usually is limited by the degree of his own experience. A better answer may be just around the corner if he can dig it up.

Both the experiences within your own company and those of other companies should be examined. Occasionally the death blow to a proposed project is delivered by an executive who states, "We tried that ten years ago and it didn't work." Be sure you know your own company's history on your activity. The answer is often found in the experience of some other company faced with similar problems. While this other company often turns out to be your competitor, you are not necessarily stopped by that. It is surprising how cooperative your competitors become in exchanging information on mutual problems.

Custom-Built Plan

In most instances, a ready-made plan won't suit your purposes. You must custom build your own device. Here you must be both imaginative and practical. It is often helpful to carry along two or three plans, testing each as you build and finally deciding upon one or two for final decision. Your synthetized plans should be tested synthetically. One way to do this is to get together with two or three of your experienced colleagues and give your plan or plans a mental test run. With this group you will check it against all the operating conditions that the group of you can imagine. As a result you will iron out a number of bugs in your plan, and sometimes this revelation of a major obstacle will cause you to radically revise your ideas. This is the time to do your experimentation, not in front of a group of executives at a formal presentation.

There are a number of practical checks necessary at this point. You are recommending a new product. Have you talked with the patent department? Is the new product within the product policy of the sales division? You are recommending a new form of distribution using manufacturers' agents. What is the opinion of your legal department from the standpoint of the changing interpretations of the Anti-Trust Law? Your plan involves additional current expense. Is this sensible in view of the existing expense reduction program? These are just

examples. You can waste time and money unless you think of all the practical angles to your problem.

There is one last warning in the area of project preparation. Before you are satisfied that you have the answer, review your plan with the specialists. That is, check the engineering aspects with your chief engineer, financial angles with your controller, personnel changes or policies with your personnel director. You should do this to obtain the benefit of their professional advice, and, most important, to acquaint them with your project. These officials may be present when you present your report and without this presentation the following conversation might take place. The president asks, "Mr. Controller, are you familiar with this project?" He answers, "No, sir, first time I've heard of it." Immediately a sizeable road block is thrown in the path of your presentation. How different when he answers, "Yes, I am familiar with the project. Joe Smith and I have covered it thoroughly and it makes sense to me."

Now let us proceed to the presentation itself. First we shall discuss "What to present" and then "How to present." Both are of significance to the success of our project.

A report to management may take any one of the following forms:

(1) *The verbal report.*
(2) *The short report or memorandum.*
(3) *The long report, with brief summary of conclusions.*
(4) *The charted or graphic presentation.*

From the degree of importance of the projects as we have defined them, we can eliminate forms 1 and 2 from our consideration. Let us discuss, then, the long report and the graphic presentation, but first of all a few words about reports in general. Many subjects are competently studied but poorly reported. If the individual making the survey is not familiar with good report writing techniques, he should get some adequate instruction or review a good reference on the subject. One useful text to be recommended is *Writing the Technical Report* by J. Raleigh Nelson, and published by McGraw-Hill Book Co., Inc.

Of particular importance in good report construction are logical organization of the material and style of presentation. The style should be simple and direct, with short, well constructed sentences and paragraphs.

In a collection of chapters on "Processes of Organization and Management," edited by Catheryn Seckler-Hudson, some guiding principles are listed:

"To be of value to a busy manager: The report must be clear, simple and direct. It must be pertinent to the stated function or subject. It must be brief and include only essential material, condensed and concisely arranged. The report must be current, complete, accurate, and informative. The report must be comparative, and must be presented on schedule."

Of course any report must be prepared in accordance with specific circumstances which will vary with each case. Even the long report must be so arranged that a comprehensive, simplified summary may be presented, read and discussed in a 30 to 45-minute session with the executives in authority.

We have used successfully the charted or graphic report. By this method it is possible to cover the major points and highlights of the subject in a series of large attractive charts. These may be up to 3 x 4 feet in size and must be carefully edited and laid out, preferably with the aid of a professional such as your promotion man. When graphs are used, the individual chart should contain no more than three curves; written material should be limited to five or six lines of a few words each. The value of a well prepared chart is that you can secure almost immediate understanding of your salient points. By judicious selection of charts you can then bring your audience along from the background of the subject through the portrayal of the present situation, its analysis, and finally to your recommendation. A word of warning: avoid the error of trying to cram too much information on each chart. Pick your major points, your highlights, then make them stand out like beacons.

After you have made your presentation with your set of charts you may have them photographed on letter size paper for multiple copies and ease of reference. In reproduction you do, however, lose the colors which brightened your original large charts.

Critical Point

So much for "What to present." Now, on to the "How to present."

We have reached the critical point now in selling our project. The mortality is high here, needlessly high! Too many systems and procedures men, industrial engineers, other engineers, managers, supervisors and even vice presidents seem to feel that the reports should merely be handed to someone, or distributed in the company mail and the job is done. Nothing could be farther from the truth. Now is the time for ingenious planning and personal salesmanship! Even if your boss assigned you the job, he still must be convinced or your time is wasted.

Some of you may be inclined to argue this point. You may feel that a properly prepared report should sell itself. Such is not usually the case. You can't rely on your report getting the desired results any more than the sales manager can depend on a piece of well designed advertising to get him the sale. There are too many hazards along the way. To your sorrow, you may find your report has not been read, or read only partially, or misunderstood. Or your executive group may have different

(Continued on Page 25)

Control of

Machine Accounting

Equipment

by F. M. Johnson

A 1952 Management Conference Paper

SINCE 1928 the Prudential Insurance Company has found it expedient to use International Business Machine Equipment. The first trial installation was small and included a limited number of operators and equipment. Once the worth of machine accounting for insurance office administration was clearly established its application was rapidly expanded. Today, the Prudential employs over six hundred people who use more than a thousand pieces of I.B.M. equipment.

Excluding keypunch equipment and operators, the rest of the people and machines are working in some thirteen separate installations or departments. Size of these units varies from very small, a dozen or more machines and a few operators, to the largest department where there are well over a hundred machines and a large number of operators. A recent job survey revealed we are processing in the neighborhood of two thousand regular repetitive machine accounting jobs.

To increase the efficiency of our I.B.M. operations, we must first determine with what efficiency the work is being processed. For several years, we have been working on this problem, and have developed and installed a system which though by no means perfect, does provide basic data for answering several vital questions.

In the final analysis cost would seem to be the best efficiency or productivity index. That is, what does it cost to do this I.B.M. work in relation to what it should cost or what it is worth. This is not always the same, as you will occasionally find a job which is relatively expensive and inefficient I.B.M.-wise — but is worthwhile when compared with other means of doing the same work.

Why is this cost important to us? In industry, if you can manufacture a better product for the same cost or an equal product for less money, your competitive position is greatly improved, the "better mouse trap" theory. In

MASS installations of punched card equipment have proved to be life-savers for large organizations, particularly when their business is insurance. Here is where efficient control really pays off!

insurance circles, we speak of net cost. How much do our policyholders have to pay for insurance protection as compared with other companies?

Our standing with respect to this net cost among the larger insurance companies has a great deal of competitive significance. This cost of doing business is the principal element over which we have a measure of control. Mortality experience and investment yield do *not* vary greatly from company to company.

In 1951 this cost of doing business included a $4,000,000 charge for I.B.M. operations. Excluding $700,000 the cost of data acquisition, key punching and verifying, we spent about $3,300,000 dollars in the following manner:

$1,600,000, Salaries, 48% of total
$1,370,000, Rent and taxes, 42% of total
$ 330,000, Card cost, 10%

For this sizeable sum, we had a staff of about 400 using over 600 machines. Here is ample justification for developing an overall control system. The potential saving to be realized through even modest increases in staff efficiency or machine efficiency are obviously substantial.

Effecting our cost insofar as man hours and machine hours represent dollars, some pretty pertinent questions arise. Consider the machines:

How many machines were required? Is this $1,370,000 rental tab fully justified?

This is part of an interlocking chain, for to say how many machines we required, you must first answer the question — How much were they used?

Still the equation isn't complete, for the mere fact that a machine was used several hours doesn't answer the $64 question: "How much work was produced during the time the machine was used?"

Thus, to fully answer the question "How many machines were required, one must first establish how much the machines were used and whether a satisfactory amount of work was produced.

One further question must be considered as we know that all of the time a machine is used will not be productive. Therefore, we ask: How long should the job or work have taken?

All of these questions are pertinent even though the final payoff is the percentage of the machines' capacity to do work realized. Let's look for a moment at what happened to some 920,000 hours of machine time available to us last year:

410,000 hours, 45 per cent of the available time represents real production. The percentage of the machines' work capacity we realized. This is to say, if a machine will make a thousand bolts an hour at rated speed, our average production was 450 bolts per available hour.

An additional 200,000 hours, 21 per cent of the available time, the machines were assigned to work. This time, nearly a third of the 610,000 hours the total time machines were used, was non-productive in the sense that no actual work, cards machined, was produced. Some, but probably not all of this 200,000 hours can be justified as it includes such things as: (a) Set-up time, (b) test time, (c) card handling time, and (d) work delay time.

The balance, 310,000 hours, slightly more than a third of the total available time, the machines were neither producing nor being used, but were in fact, idle. This is part of the price one must pay for scheduling.

The type and average number of machines used are: reproducers, 72; interpreters, 61; sorters, 168; collators, 72; calculators, 27; tabulators, 128; and summary punches, 88.

How we go about answering these questions on machine needs will get us into the actual machine usage program. First, a brief look at the staff or man hours side of the picture.

If we become detached for a bit and recognize that sound personnel management policies are assumed and that now we are concerned with a group of people or staff, and not the individual, many of the same questions asked about machines must be repeated. For instance: How many people were actually used in doing this work? Is this more or fewer people than should have been required? Were these people occupied in: Operating machines? Supervising? Training, or doing manual work?

Thus, some means of measuring operator productivity

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and determining how many operators should have been required to do a given amount of machine work is desirable.

So far, we have dealt with staff and machines and time, what then of the work cost?

On one hand, we know the actual salary and rental dollar cost or expenditure. As we have set up the means of determining how many man-hours and machine-hours either were or should have been required, it is a relatively easy matter to determine the actual cost or estimate the expected cost. A comparison of the actual to expected provides an index of work efficiency. However, space doesn't permit full treatment of all of the job pricing techniques.

Machine work as such can be reduced to certain basic machine time elements. In developing several ratios of varying significance, charts have been prepared. Each attempts to segregate two or more different machine time elements. Remember one of our earlier questions: "How much are machines used?"

To determine machine usage, we must determine how much of the available time the machines were used.

The elements are:

1. Available time — 7 hours per day, plus overtime, minus breakdown.
2. Used machine time — Time the machine was actually tied up on a job or jobs. This amounted to 70 per cent of the available time.
3. The remainder — idle machine time or 30 per cent of machine time.

Idle machine time can best be reduced by careful schedule control. As a practical matter, this is quite a difficult problem particularly when you are faced with the prospects of doing varying amounts of work which must be completed to meet a rigid payroll or production dead-line.

If other things are equal, increased usage would reflect increased machine efficiency. Unfortunately, other things frequently aren't equal. Therefore, we must consider the actual work performed during the used machine time.

How much of this used machine time was productive? About 60 per cent. As far as the I.B.M. machine is concerned, each job and thus, the aggregate amount of work includes some productive time, which we define as machine running time, and some actual handling time. Actual handling time was about 40 per cent of the time the machines were in use.

Productive machine time. The payoff part of the time machines are used is by definition the time the machine was actually processing cards. In the trade this is often called machine running time. You may be interested in how we arrive at this time. More about this further along.

Actual handling time. This includes such things as card handling, set-up and delay time. It is that time the machine was tied-up on the job but was not feeding cards. In other words, it is time chargeable to the job since the machine was not available for other work.

Attained machine output. The percentage of used machine time which was productive, is a real measure of the job as well as the efficiency with which it was handled. This ratio varies from very low to well up in the nineties. Some of our larger jobs have attained machine output ratios of .92 to .95.

You will want to know how we determine how much of the machine running time is actually productive machine time. This is probably the most important time element with which we are concerned. This time is the product of the card volume and the machine running time rate. For example, the reproducer, a constant speed machine, runs at a fixed speed of 100 cards per minute, 6000 cards per hour. To reproduce 1000 cards, the reproducer must be used something more than 10 minutes. Afted plugging in the control panel, joggling the cards and otherwise making the machine ready, it must still run a full ten minutes. The time over and above ten minutes is the actual handling time which we referred to before. Obviously it is desirable that as much of the running time as possible be productive machine time.

Batch Runs, High Output

Again, other things being equal, this depends largely on the batch size. By processing several thousands of cards through a machine once set up, high machine outputs may be realized.

I can hear someone saying, "So far so good — constant speed machines — but what of the bigger beast, the tabulator? More often than not, this is where the end product becomes available, — the report, the check or the bill. Furthermore, this is the one that costs real money. The latest model 407 tabulator may rent for as much as $945 per month and its speed isn't constant.

For all regular recurring jobs, we have established machine running time rates. This sounds like a jaw breaker, but is in fact, the speed at which the tabulator will actually process cards. Card volume times this rate equals the productive machine time for the job. These rates can be and are established in any one of three ways.

1. By electronic timer. Several of these were made a few years ago by us. It is a device which can be attached to a tabulator, collator or calculator and will count the cards machined and record the time the machine is actually feeding cards. After sampling the job the rate is figured by dividing the accumulated machine running time by the cards processed through the machine.
2. Timing can be done by stop watch although it is more difficult as the time the machine is not running must be excluded.
3. Fairly accurate rates can be set by analyzing the

job and determining the number of control breaks for totals or summary punching per unit volume of cards.

To repeat, the productive time to used machine time is a real measure of the job. If we relate the total productive machine time for all jobs to the total available machine time, we can state what percentage of the machines' capacity to produce was realized. Such data are worked up periodically. By setting some value on handling time, the necessary evil of every machine job, we can estimate how long the job or work should take. This is called expected machine time.

Before discussing the significance of the components which make up this expected machine time, consider its relationship to used machine time.

1. Expected machine time — time the work should have taken. It is an estimate including both productive machine time and estimated handling time. This will be covered in further detail in reviewing the next chart.
2. Additional set-up and delay time. This is set up, card handling and delay time in excess of expected time for such efforts. Such time in excess of expected may be the result of trouble in setting up or checking out the machine, cards may have needed extra handling or batches of work due for processing may have been delayed after the machine was set up.
3. Machine operating rate — the percentage of used machine time the work should have taken is helpful in determining how well a given job or volume of work was handled. We found the machine operating rate to be 80 per cent of the used machine time.

As opposed to the attained machine output, productive machine time to used machine time, this last ratio, machine operating rate, provides a useful measure in reviewing job processing of both large and small batch sizes. Where the attained machine output must necessarily be low in processing small batches, the machine operating rate provides a better indication as an average allowance had been made for machine set-up and card handling.

In one instance, we have dealt with the pure product, machine running time; in this second instance, we are dealing with expected machine time, an estimate of how long the work should take including a reasonable amount of set-up and card handling time. This might be considered the difference between pure production and what may be reasonably expected. One further distribution of machine time is worked up. The inherent job breakdown or the percentage of the expected machine time which is productive.

Scheduling and procedure efficiency is a ratio which gives us some idea of the batch size which is in turn, the end result of the procedure and scheduling requirements. Of the two components, one is the productive machine time with which we have dealt at some length; expected set-up time is the second and is actually the handling constant or sum of several handling constants.

This division of the time required to do a machine job, productive time during which the machine is feeding cards, and set-up time, became clearly defined during our early survey activities. A set of handling constants, expected set-up and card handling time, were developed, one for each different machine type. These were reviewed with the supervisory staff and after a few minor changes adopted. They have been used ever since and are added to the productive machine time in determining the expected machine time. Of the total expected machine time, 80 per cent was productive machine time.

As we allow one handling constant for each time a job is set up, the percentage of expected machine time which was productive varies in direct relation to the batch size. A job processed in large size batches, several thousand cards, will have a high index or ratio, as opposed to the job which requires the processing of a few hundred cards at a time.

Various Distributions

To recapitulate for a moment, this mass of data which is normally summarized once a month by machine type within job, can be distributed in any one of several ways:

By hour, day, week, or any desired period.

By machine, either type or specific machine.

By job or by operator.

By the same token, the ratios just discussed with the exception of usage, used machine time to available machine time, can be obtained on any of the above bases. As presently administered the various ratios discussed are calculated by division, by month, by machine type. If the ratio trend is downward, major jobs, also reported on a monthly basis, are reviewed in an effort to localize the basic cause of the adverse trend. The overall material is in such detail as to permit a comprehensive analysis when warranted. So far, we have considered in some detail the distribution of time machines are used. The material relates largely to the machine and job; as this work is accomplished by the operating staff we need a tie-in.

It would be desirable to have data permitting us to arrive at general answers to such questions as:

1. Expected or required man hours necessary to process the machine work involved as related to the actual man hours used.
2. Distribution of staff on an expected vs actual basis as to:
   a. Supervision and training
   b. Manual work
   c. Machine operating

There are several ways of getting at this. We have elected to use two datum sources:

1. Machine usage statistics,
2. Monthly time reports, from which we can determine the actual staff available.

It goes without saying that the I.B.M. machines we have today require operators. The true robot seems to be many years away. How then, can we relate man hours to machine hours? Let me say right off the bat that the man hour part of the problem is subject to many variables. Necessarily, we have had to concern ourselves with average conditions. In trying to bracket this will-o-the-wisp, recourse is made to attention factors — the relationship of man hours to machine hours. How many man hours are or should be required to do a job calling for 10 hours of tabulator time? With the exclusion of such things as personal, fatigue and delay time, it becomes apparent that not more than one man hour is needed for each machine hour at the outside. In many instances, machine work is planned and laid out so an operator can operate more than one machine at the same time. This multiple machine operation which is affected by the job, location and availability of machines, operator skill, etc., seems to be influenced more by the type of machine than any other single factor. It can be shown that a good operator can handle several interpreters at once, whereas an operator may find it very difficult to get good production out of a single collator if the job is fussy. Thus, we have found attention factors vary from one man hour for each machine hour, downward.

Estimate Time

By applying average attention factors to the used machine time we can and do estimate the expected operator time, man hours the job should take. In actual practice these factors are loaded for supervision, training, and manual work, so that the final expected staff is an estimate of the overall man hour requirement based on the machine work completed. This is compared with the actual available staff in calculating the operator rate of production. During August, 1951, our staff devoted their time to I.B.M. operations as follows:

1. To supervision and training, 17 per cent of available time.
2. To manual work, board wiring, etc., 7 per cent of available time.
3. To operating machines, 76 per cent or the balance of the available time.

For every man hour devoted to operating machines 1.10 used machine hours were produced. This is the reciprocal of an attention factor of .91. That is to say, a little more than nine-tenths of a man hour was required to produce one machine hour of work. The effect of time devoted to supervision, training and manual work is excluded in this case.

How do we go about assembling all of these data? The source document is the operator's reports. He is, of course, the only one who can tell you how long the job actually took. He records job number, start and stop time, machine number and card volume. Each entry is key punch and the cards are subsequently processed thru the sorter, reproducer, calculator, and tabulator. The finished cards include all of the following data. Date and division number; operator number; job code; cards machined; start and stop time; machine running time rate; productive machine time; expected machine time and used or actual machine time.

When the situation warrants, we do make reference to the detail cards and by rearranging the card order prepare various types of special analysis. Before discussing such questions as you may wish to bring up, I'd like to outline briefly some of the administrative approaches to this program.

Where Inefficient?

One of the first questions to be answered is, of course, the number of machines required in any given I.B.M. equipped division. Here we have a direct answer as to the percentage of available time machines were used. This ratio which is worked up monthly by machine type quickly reveals low usage,—the possibility of withdrawing a machine or high usage including overtime — the possible need for an additional machine.

The fact that usage is high, doesn't justify additional equipment particularly if the attained machine output, percentage of used machine time which was productive, is low or if the machine operating rate, percentage of time the work took it should have taken, is below average. In either case, we would try to determine the cause for the sub-standard ratio. Is it brought about by low efficiency on all jobs or a few of the larger jobs? What can be done to improve the situation?

An analysis of the job statistics will frequently reveal the need for job revision or improved scheduling. You will recall, we can tell both the inherent job efficiency as well as the actual processing efficiency. Frequently, we will undertake detailed load studies to determine reasons for low usage. Often, it becomes apparent the work flow is causing violent peaks and valleys. Here is another indication of the magnitude of the scheduling problem. Other things such as inexperienced operators or inadequate supervision may be revealed.

Each month we compare and graph the operator rate of production. There are many ways of doing this. Presently, we are experimenting with a direct comparison of available staff or man hours to both used and productive machine time. By applying dollar factors to man and machine hours, we are able to and do calculate job costs. Frequently, recourse is made to our pricing procedure

(Continued on Page 26)

A Training Program for Systems Personnel

by H. J. Ihlenfeld

(A paper given before the Milwaukee Chapter)

TRAINING systems personnel is one of the most important points in the development of a systems department. In my estimation it is second only to the determination of the rank of the systems department within the organization.

A training program, in order to reap its harvests, must be well executed, and the primary step is formulation of the program. A training program can be divided into three major parts, i. e., selection of personnel, training agenda, and follow-up.

Selection of personnel is important to getting the job done without waste of time to you or the trainee. To do the best job of selection, I would suggest an interview to determine the applicant's background, and an aptitude test to determine his basic knowledge and personality. The required background may vary with the field to be covered, and therefore, no definite specifications can be given here. For those who might be interested, I might say that my requisites are at least several years contact with systems, preferably in our own organization, and a college education if at all possible.

I consider aptitude tests as a great aid to the employer in selecting the proper person for the job. The aptitude tests which we give our applicants for systems personnel are four: personality inventory, preference record, mental maturity, and clerical ability. Through the personality inventory, we are able to gain an insight to his personality traits such as adjustment, self-sufficiency, extroversion factor, dominance, confidence, and sociability. In no other field do I feel personality more important to success than in systems work. Important to your and his success is also the desire to do the type of work, and this can be determined through the preference record which indicates preferences such as mechanical, computational, scientific, persuasive, artistic, literary, musical, social service and clerical. The more important of these in sequence of importance are as I see it persuasive, social service, computational, and literary.

Having established the basis on which personnel are to be selected, the next step is to set up the training agenda. This would probably begin with the period of indoctrination during which the trainee would be told his specific assignment, the organizational structure of your company, the need for the work of your department and the presently established procedures. In telling him of his specific assignment, be sure to fully explain that assignment and the limits to which he will be responsible, and make sure that he understands. I might suggest that you prepare a written job description for this purpose so there will be no controversies later. Knowing the company's organizational structure will better prepare him to go to the right people for the right answers.

Prepare your pupil for the time he has to defend your and his convictions by teaching him the basis upon which your work is founded and why the need for it is there. Don't throw him to the wolves without some armour.

It is well that your trainee know as much of presently established procedures before he begins to delve into his assignment. A method of accomplishing this

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which I have found to be very successful is to have the trainee chart the procedures from the written word, thereby embedding them in his mind firmly.

Now that you have planned his indoctrination, the next step on the agenda would be teaching him to do the job. This, also, may vary for the different applications so I will enumerate what I would consider important to our phase of operations.

How to investigate the problem. This generally requires all the patience one can muster. Now here it is necessary to get as many opinions as are required to arrive at a decision. Take advantage of the experiences of other people more closely allied to the problem. Then one must establish comparative costs of the different methods being considered. Fortified with these facts one must weigh the facts impartially, and finally make a decision which you believe best for your company.

How to chart the flow of paper. This will require that you develop the artistic ability of your student. Neatness and conciseness are of utmost importance. No doubt you have a style which you prefer, and if that is the case, make sure that your student understands. The best method I have found for developing this is by having the student make flow charts from written procedures already developed.

Writing Procedures

How to write procedures. This is a subject in itself and shall only be discussed briefly, however, it is the heart of your efforts. How well your man will learn this determines whether or not you stand or fall, unless you are fortunate enough to have a separate systems man to edit all of your procedures. He should be taught your writing style, your choice of words and colloquialisms and your format.

How to conduct a meeting properly. In that many decisions are made through called meetings, he should learn to conduct one properly.

The next point on the agenda would be to develop the proper personality traits. If you are fortunate enough to have been able to subject your applicant to an aptitude test, the determination of which traits need developing is relatively easy. If not, you will have to cover them all. I would like here to mention a few points which I believe so essential in this kind of work and those are team work, impartiality — even to one's own ideas, fair play, diplomacy, confidence, salesmanship, and understanding.

Speaking of team work I would like to repeat a statement made in one of our recent programs by Charlie Hoffman of Nordberg Mfg. Co. when he said, "The systems man should be considered the coach and the line men, the players." This is indeed an excellent point for the systems man to remember.

The last point in the training program is the follow-up to keep both the trainee and yourself on a common ground. Even though you do not exactly conduct a school, the old custom of report cards is still a good one. For this purpose I would suggest that you prepare a progress report on your employees at least quarterly. This report would state what he has done and how well, what you would comment on his personal qualities and what he can do to improve both his work and personal qualities. It is well then to discuss the report with the student. Plan how, where and when to discuss it, and I would recommend that it be done privately. Predetermine, if possible, the student's reactions. Put the student at ease, probably by discussing one of his interests before you get to the report. Explain the purpose of the report. You might also remember that this report can be a good basis for determining merit increases. And lastly, be sure to explain why the employee was rated as he was. Be sure also to give him an opportunity to express his opinions of your rating. You may be surprised how much this does toward cementing human relations.

As far as the trainee is concerned, your program is completed. However, it is wise to look at ourselves as teachers and ask ourselves if we measure up to the standards. It would be well to ask yourself the following questions regularly, and if your answers are all yes, no doubt your student will be doing well.

Have I been patient and understanding?
Have I been a good model? Remember, students generally pattern themselves after the teacher.
Have I listened to his suggestions diligently?
Have I used such suggestions of his which were good?
Have I encouraged him when he has done well?
Have I provided him with the proper tools?

In closing I would remind you of what I believe to be of utmost importance to all of us. Remember that your reputation is built by the people you have taught to do the job for which you are responsible, and that you can advance to greener pastures only when someone else can fill your shoes.

Measuring Work

(Continued from Page 8)

thereby insuring greater accuracy in the work leaving them. Many problems and questions must be answered satisfactorily before unreservedly embracing such a technique, but there is sufficient good in what has been done to encourage further research.

Heretofore, the auditing function has been concerned primarily with the adherence to standard procedures and the adequacy of accounting controls, as well as any evidence of malpractice. The installation of a program of clerical management and cost control would increase

the responsibility of the audit groups to report nonconformance to either budget standards or standard methods, as well as their present objectives. In addition, it is well for the audit groups in their analyses to point out revealed weaknesses in current procedure methods, improper use of office equipment, antiquated and inefficient methods of accounting operation, and the presence of inefficient and improperly trained personnel. This close relationship between the procedure and audit functions makes for a very harmonious and effective policing of the current clerical processes.

The problem of securing qualified personnel to man a clerical management and cost control program is very acute.

A qualified man possesses an inquisitive nature with the ability to direct himself along the paths of research, keeping in mind the ultimate objective. He must be able to use his past experience and new-found knowledge to lift himself each step of the way. Above all, he must be able to think for himself and carry a logical cause to an ultimate effect. There is very little in books today for reference since we are still compounding the principles and rules, borrowing experience and knowledge from present scientific management facts.

Emerging from the needs of business and facilitated by the recent recognition of the Controllership principle, methods work has become an integral part of current day clerical management and cost control. The systems and procedures function has expanded from the requirements of an unwanted record to a highly specialized service, charged with the responsibility of establishing methods and procedures in line with scientific principles and research. Its objective is to reduce clerical records and details to their lowest possible cost in line with adequate managerial control in all phases of a business entity.

Work Simplification

(Continued from Page 14)

What were the results? Changes in procedure were made that resulted in reducing operating expenses $4400 per year. The cost of presenting the program amounted to only $900. Net savings for the first year amounted to $3500. The number of personnel in the unit was reduced from 15 persons to 13 persons — one reduction through turnover, one through transfer.

Reasons for success of program? It was felt that the second program was a success for the following reasons:

(1) Direct attention and assistance by a trained methods analyst insured continuous action on the program.

(2) Informal presentation avoided over-emphasis on the tools of work simplification and concentrated more on the philosophy of work simplification.

(3) The supervisor was definitely interested and had a goal — a desire to prove he could make this system work.

Work simplification can and does work. This fact has been proven in hundreds of companies. It can be proven in yours. Work simplification will help you to:

(1) Eliminate unnecessary jobs and thereby reduce expense or make more hours available to you for important jobs.

(2) Reduce the steps required to do necessary jobs and make complex jobs simpler.

(3) Make jobs easier by providing ideas which can lead to better work scheduling.

(4) Make jobs easier by eliminating bottlenecks.

At the start of this paper, I listed four keys to work simplification. Of these keys, perhaps one is most important — that is the key that calls for action. Work simplification does not force itself on you as most of your other work does. You must take the initial steps yourself.

Don't wait until you have time to do something about work simplification on a large scale. You may never get to it. The way to achieve results is to assign yourself the job of regularly spending a small amount of time each week working out your own problem. Do it in a systematic manner and I can assure you the results will be gratifying.

Selling Projects

(Continued from Page 17)

interpretations of your program. Or there just isn't time enough to get the complete group together to make a decision. Your good work should not stop here. Now is the time to sell the project.

What do I mean by selling? Selling projects is pretty much like selling a product. You want to create interest, then desire, then you make your sale by getting that top-side approval. Selling is actually influencing or persuading. I suspect that some people think there is some unethical or shady connotation to the word "selling." A student of mine last year argued that there was something immoral about having to sell a sound project. He was obviously confusing good selling with bad selling or over-selling. Selling in our case is getting the other fellow to understand the benefits of our proposition. Here lies the key to our discussion. To be sound, our plan must bring benefits to the organization; our selling job is to convince management of these benefits.

Most supervisors or planning people could benefit from a course in the fundamentals of salesmanship. Let us look to see how some of these fundamentals apply to our task.

Percy Whiting, of Dale Carnegie's staff, has written a book called *Five Great Rules of Selling.* He lists the five rules as (1) *Attention,* (2) *Interest,* (3) *Conviction,* (4) *Desire,* and (5) *Close.* You will find that we use most of these rules in getting the other fellow to accept our point of view and approve our project.

Good product selling includes a well designed presentation; attention to the timing, the setting, the individuals. You, too, must be similarly concerned in getting over your approval hurdle.

You surely want to present your plan to the executive or executives who can make the decision. You don't want to do the job over two or three times, nor do you want your boss or his boss to do it for you. So don't hesitate to ask for the right audience. Next get the right setting. If possible secure a conference room away from telephones and other interruptions. Nothing is quite so deflating as to have the big boss called away just as you are bearing down on your climax. It is well to ask for a specific length of time, but don't overdo it and take too long. If your report is in good shape, an hour should cover both presentation and discussion.

No single factor is of greater importance in planning your presentation than in knowing your executives. You must take into account their background, experience, degree of understanding, and possibly their known attitudes on your subject. Perhaps you should present some background or history if your man is relatively new in the company. A non-technical executive may require a simple explanation of how your product operates or your system works.

Know Their Thinking

The attitude and manner of thinking of top executives should be understood. Most of them take their responsibilities seriously and, therefore, deliberate carefully before making important decisions. The seller then must be prepared to support his recommendations at, what may seem to him, undue lengths. In no event should he consider such cross-examination as opposition and begin to show annoyance or impatience.

Confidence in your subject is contagious. Know your plan thoroughly, and show you believe in it. Your obvious enthusiasm, confidence, and knowledge of your subject may be the deciding factor in your favor. In this connection, it is recommended that you rehearse your presentation at least once, and preferably several times in advance before your friends or colleagues. Your confidence grows with each such practice and the questions generated may well point to areas of your presentation that need checking or strengthening.

As to the final step in your presentation, I find it often advisable to present one or two alternatives to your recommended plan. If your plan is really good, the benefits will stand out in contrast for all to see. The executive gets a feel of the comparative worth of your plan as he sees it lined up against the next best. He has a yardstick to help him with his decision.

The successful salesman ends his presentation by asking for the order. You should do likewise. Ask management to approve your plan. In fact you should, if possible, make it easy for them to do so by having the necessary forms or papers ready for signature. Then as you see that desired signature scrawled on the official form, you can lean back and enjoy the moment. You have sold your project to management.

Accounting Equipment

(Continued from Page 22)

in determining the man-and machine-hour requirements as well as the cost of procedure revision or projected I.B.M. jobs. In every case, reference is made to company operating ratios so that in effect, we price work on the basis of what is cost to do.

In an attempt to provide self-indicating data to top management which clearly reveals the productivity of the machines and staff, two indices have been developed.

1. *Machine productivity.* This is the productive machine time per available hour. Insofar as this is the percentage of the machine's capacity to do work which was realized, it can be construed as that amount of the machine rental which was justified at 100 per cent efficiency, no credit whatsoever having been allowed for set-up, card handling and delay time.
2. *Staff productivity.* This is the productive machine time per available staff hour. This is not necessarily the percentage of the staff's capacity to do machine work realized but is the percentage of available staff hours equal to productive machine time. While the connotation is not so absolute as the machine productivity, it is a real measure of the work, by the same token might be considered as a percentage of the salary cost fully justified by productive machine work. Again, no credit whatsoever has been allowed for machine set-up, card handling, delay time, or staff utilized for supervision, actual machine work, produced by the staff and training, or manual work.

Both of these indices are necessarily very harsh, everything having been subjugated to the end product, productive machine time. Thus, we have travelled along the road from a mass of detailed data obtained from the operator's report to two ratios or indices. Insofar as we improve any of the ratios, we increase the value of the many dollars spent in doing a tremendous volume of I.B.M. work.

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